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Indian Standard

INSULATOR STALKS FOR TELEGRAPH AND TELEPHONE LINES—SPECIFICATION

(Second Revision)

भारतीय मानक

टेलीग्राफ तथा टेलीफोन लाइनों के लिये
स्टाक अवलंब विधुत रोधक --- विशिष्टि

(दूसरा पुनरीक्षण)

UDC 621·315·654:621·394·73+621·395·73

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

July 1990 **Price Group 5**

Electrical Insulators and Accessories Sectional Committee, ETDC 3

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards on 28 March 1989, after the draft finalized by the Electrical Insulators and Accessories Sectional Committee had been approved by the Electrotechnical Division Council.

This standard was first issued in 1960. The first revision of the standard was carried out in 1966 to incorporate the changes in the light of experience gained by the Posts and Telegraphs Department and also to rationalize the dimensions of stalks as far as possible. The second revision of the standard has been taken up to incorporate the following modifications:

a) Only the use of zinc has been specified for galvanizing the ferrous parts and the alternative methods of protection have been deleted as no test methods have been available,

b) Inspection gauges for screw threads for 'No Go' and 'Go' types have been simplified,

c) The requirements of PVC compounds for washers have been added,

d) Use of leather washers has been deleted for uniform supplies, and

e) The sampling procedure has been revised to provide uniform quality levels in the lot inspections.

The stalks covered by this standard are suitable for porcelain insulators covered by IS 283 : 1976 'Specification for porcelain insulators for telegraph and telephone lines (*third revision*)'.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

INSULATOR STALKS FOR TELEGRAPH AND TELEPHONE LINES – SPECIFICATION

(*Second Revision*)

1 SCOPE

1.1 This standard covers the requirements and tests for the following types of insulator stalks intended for use on telegraph and telephone lines:

a) Stalk, telegraph (*see* Fig. 1);
b) Stalk, telephone (*see* Fig. 1);
c) Stalk, swan neck, long (*see* Fig. 2);
d) Stalk, swan neck, short (*see* Fig. 3);
e) 'J'-Stalk (*see* Fig. 4);
f) Bracket attachment terminal, single (*see* Fig. 5); and
g) Bracket attachment terminal, double (*see* Fig. 6).

1.2 The requirements of porcelain insulators for telegraph and telephone lines are covered in IS 283 : 1976 'Specification for porcelain insulators for telegraph and telephone lines (*third revision*)'.

2 REFERENCES

2.1 The Indian Standards listed in Annex A are necessary adjuncts to this standard.

3 TERMINOLOGY

3.0 For the purpose of this standard, the following definitions shall apply.

3.1 Stalk

A mild steel pin or spindle threaded at one end for screwing on the insulator and the other end so shaped as to fit into the stalk holes of different types of brackets, bracket attachment transposition or other support mounted on any suitable fixture or driven into the wall, window-sill or any other fixture.

3.1.1 *Swan Neck Stalk*

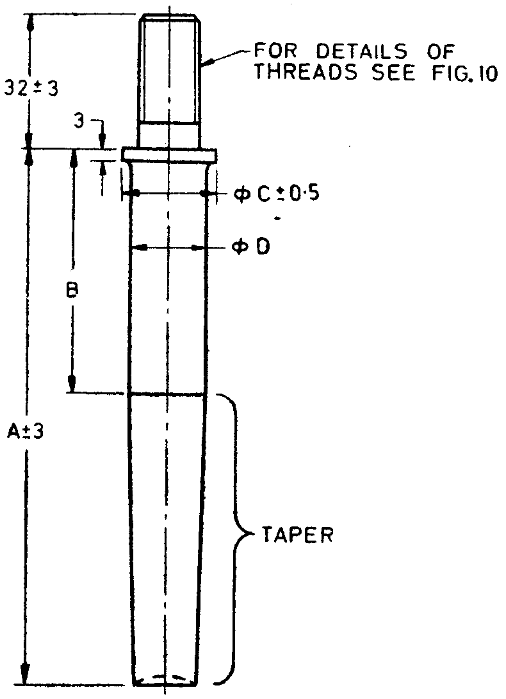
A mild steel pin or spindle bent to U-shape at one end and straight at the other. The U-shaped end is threaded (*see* Fig. 2 and 3) to take the line insulator. The straight end (fixing end) of long swan neck stalk (*see* Fig. 2) is provided with metric threads and associated nuts. The straight end of the short swan neck stalk (*see* Fig. 3) is provided with coach screw threads. The straight end is intended to be fixed to some firm support like window frames, walls, etc.

3.1.2 *'J'-Stalk*

'J'-Stalk is a J-shaped insulator spindle used for terminating a single overhead telegraph or telephone line wire. One end of the 'J'-stalk has metric threads and is provided with a nut for fixing on to a telegraph and telephone bracket while the other end is suitably threaded (*see* Fig. 4) to take the line insulator.

3.2 Bracket Attachment Terminal, Single

This is made by riveting or welding a stalk at one end of a small piece of channel iron, to the



NOTES

1 The thickness of the collar may be increased to a maximum of 8 mm, if increase in the thickness of the collar eases the manufacturing process.

2 The bottom surface of the stalk may be concave and irregular to a depth not exceeding 6 mm.

Stalk	*A*	*B*	*C*	*D*	Taper
Telegraph	136	38	24	20	1 in 24
			or		
	136	62	24	19	1 in 24
Telephone	103	49	24	16	1 in 18

All dimensions in millimetres.

FIG. 1 STALK TELEGRAPH AND TELEPHONE

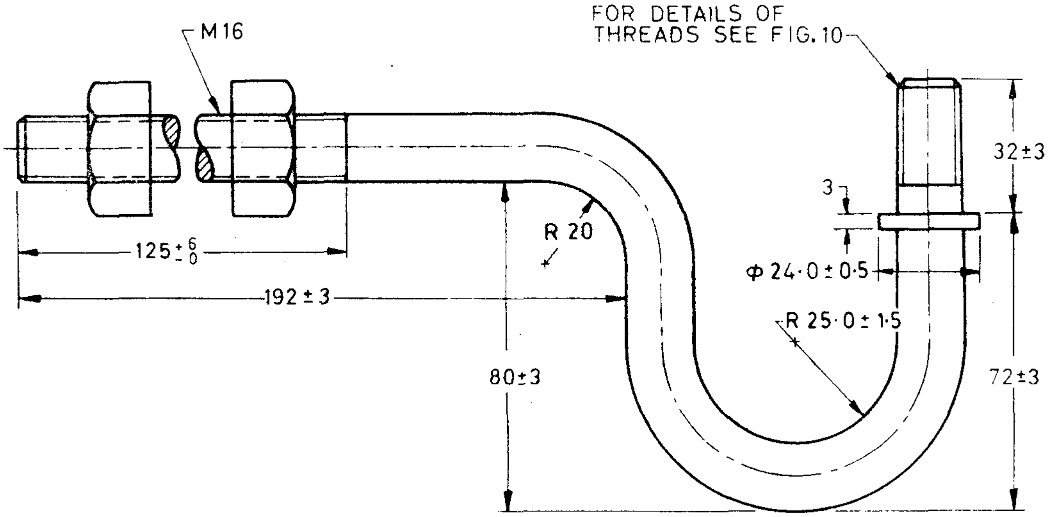
other end of which is rivetted a mild steel rod. The free end of the mild steel rod is threaded and fitted with a nut and washer for the purpose of fixing it on to a bracket. This is used for terminating one wire (*see* Fig. 5).

3.3 Bracket Attachment Terminal, Double

This is made by riveting or welding two stalks at the two ends of a small piece of channel iron (nearly double the size used in a single bracket attachment terminal) and a mild steel rod at the middle of the channel iron piece. The free end of the mild steel rod is threaded and fitted with a nut and washer for fixing the attachment to a bracket. This is used for terminating two wires, one on either side of a bracket (*see* Fig. 6).

3.4 Lot

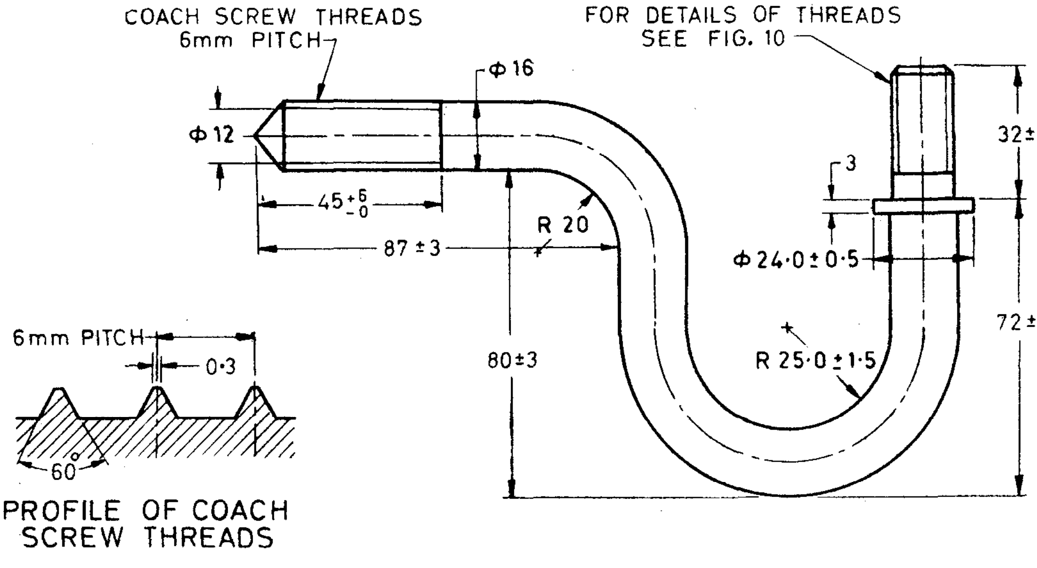
All the stalks of same type and design manufactured under similar conditions of production and offered for acceptance; a lot may consist of whole or part of the quantity ordered.



NOTE — The thickness of the collar may be increased to a maximum of 8 mm, if increase in the thickness of the collar eases the manufacturing process.

All dimensions in millimetres.

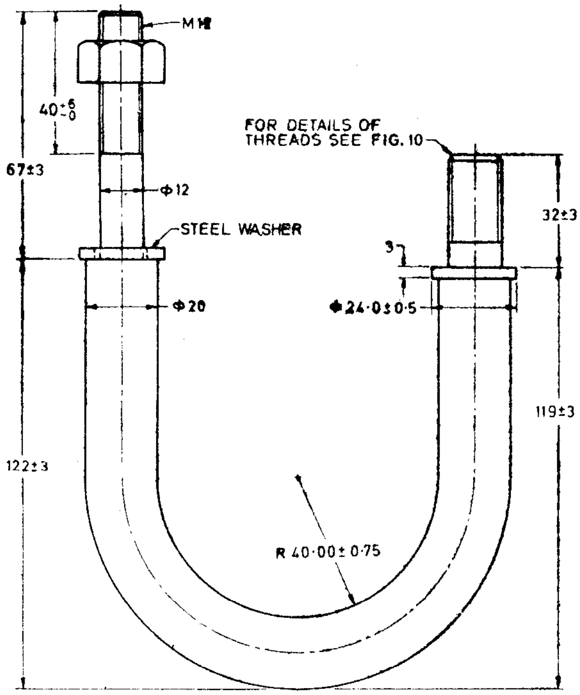
FIG. 2 SWAN NECK STALK, LONG


COACH SCREW THREADS 6mm PITCH
FOR DETAILS OF THREADS SEE FIG. 10
Φ 16
Φ 12
32±3
3
45^{+6}_{-0}
R 20
87 ± 3
Φ 24·0 ± 0·5
6mm PITCH
0·3
80±3
R 25·0 ± 1·5
72±3
60°
PROFILE OF COACH SCREW THREADS

NOTE — The thickness of the collar may be increased to a maximum of 8 mm, if increase in the thickness of the collar eases the manufacturing process.

All dimensions in millimetres.

FIG. 3 SWAN NECK STALK, SHORT



All dimensions in millimetres.

FIG. 4 J-STALK

3.5 Type Tests

Tests carried out to prove conformity with the specification. These are intended to prove the general qualities and design of a given type of stalk.

3.6 Acceptance Tests

Tests carried out on samples taken from a lot for the purpose of acceptance of the lot.

3.7 Routine Tests

Tests carried out on each stalk to check requirements which are likely to vary during production.

4 SHAPES AND DIMENSIONS

4.1 Telegraph, Telephone, Swan Neck and 'J'-Stalks

The shapes and dimensions shall be as shown in Fig. 1 to 4.

4.2 Bracket Attachment Terminals

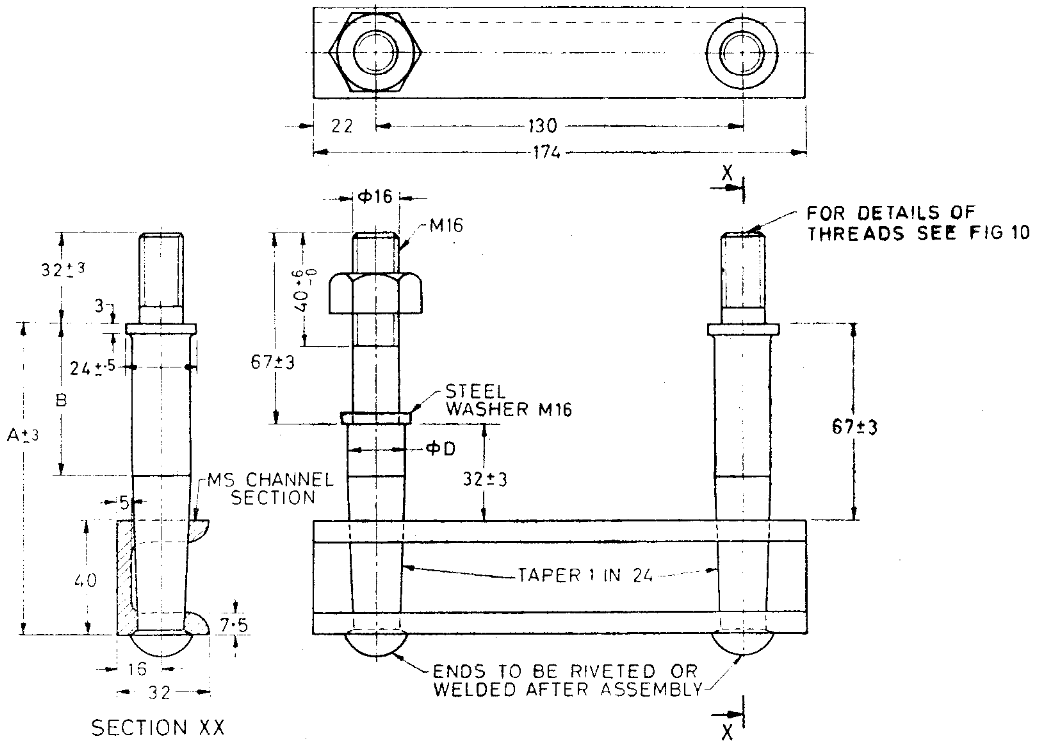
The shapes and dimensions of bracket attachment terminals, single and double, shall be as shown in Fig. 5 and 6 respectively.

4.3 Screw Threads

4.3.1 The fixing ends of long swan neck stalks, 'J'-stalk, bracket attachment terminals and the associated nuts shall have metric screw threads with tolerance designation of 9d and 8H for male and female threads, respectively in accordance with IS 4218 (Part 3) : 1976.

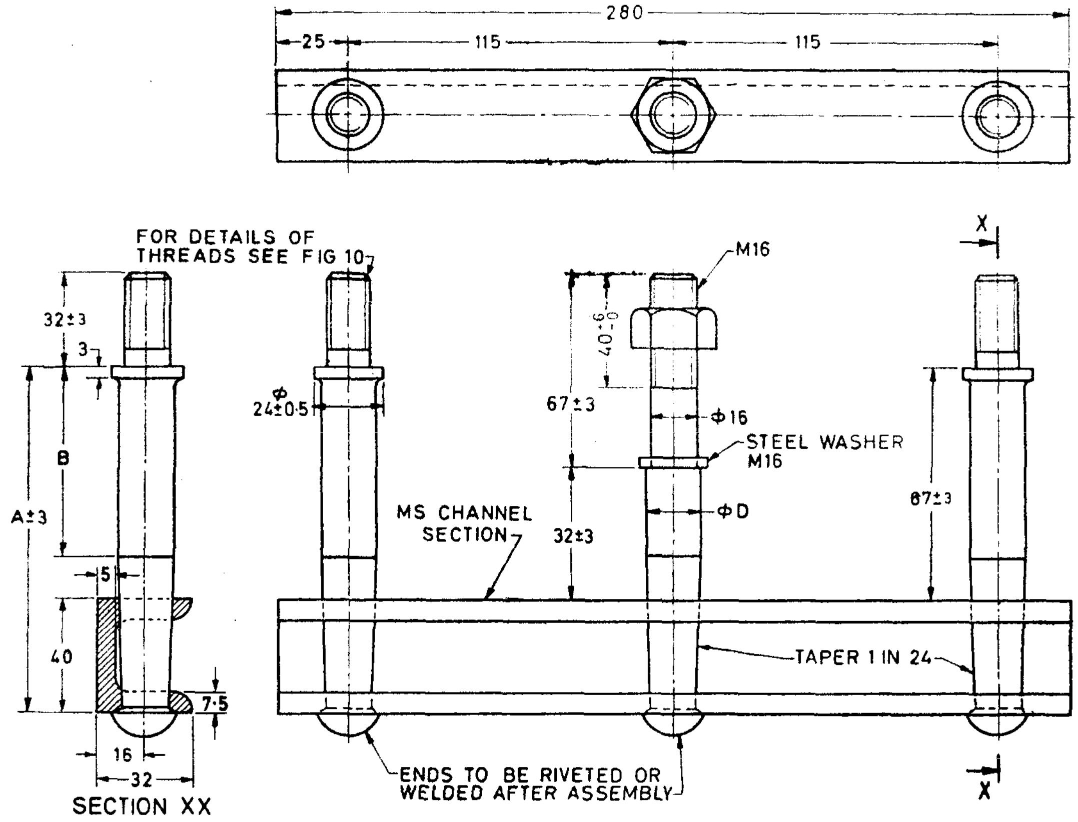
Figures 7 to 9 cover the inspection gauges for checking screw threads on stalks.

The fixing ends of short swan neck stalks shall have coach screw threads of 6 mm pitch as shown in Fig. 3.



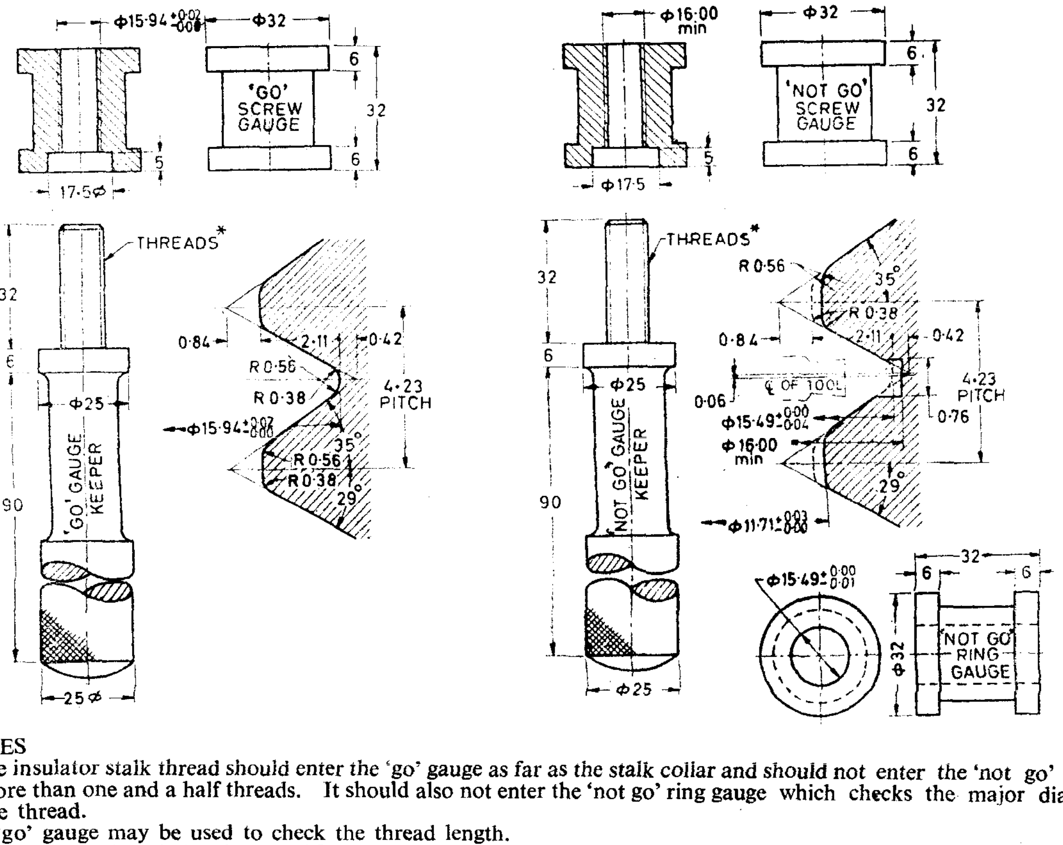
All dimensions in millimetres.

FIG. 5 BRACKET ATTACHMENT TERMINAL, SINGLE



All dimensions in millimetres.

FIG. 6 BRACKET ATTACHMENT TERMINAL, DOUBLE



NOTES

1 The insulator stalk thread should enter the 'go' gauge as far as the stalk collar and should not enter the 'not go' gauge by more than one and a half threads. It should also not enter the 'not go' ring gauge which checks the major diameter of the thread.

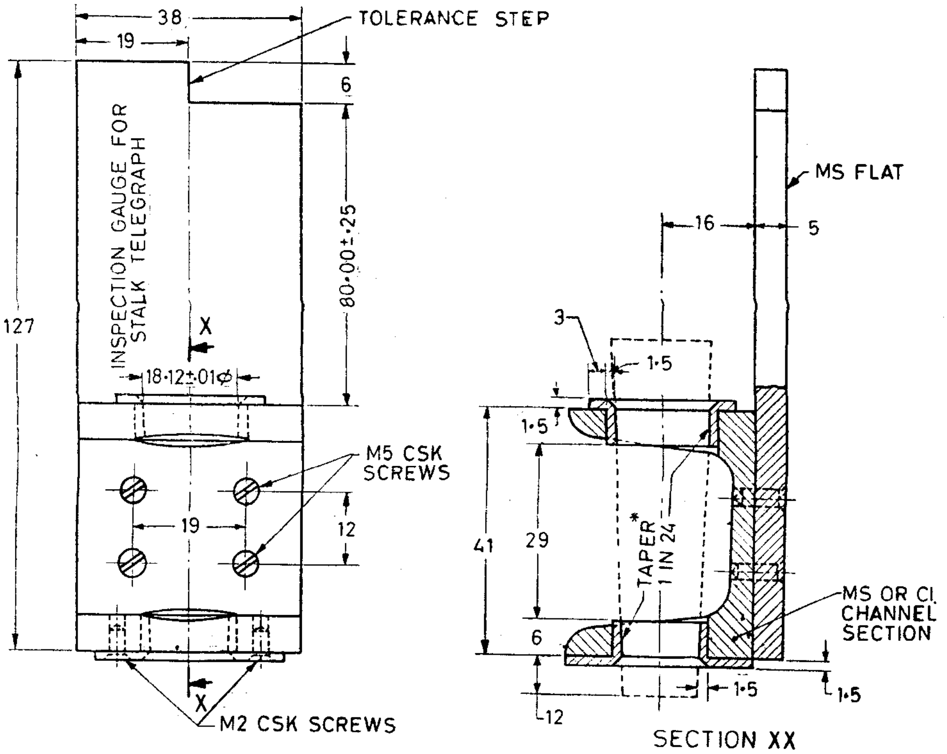
The 'go' gauge may be used to check the thread length.

2 The collars of both 'GO' and 'NOT GO' gauges are knurled.

*The threads on this keeper to be an accurate fit in gauge without shake.

All dimensions in millimetres.

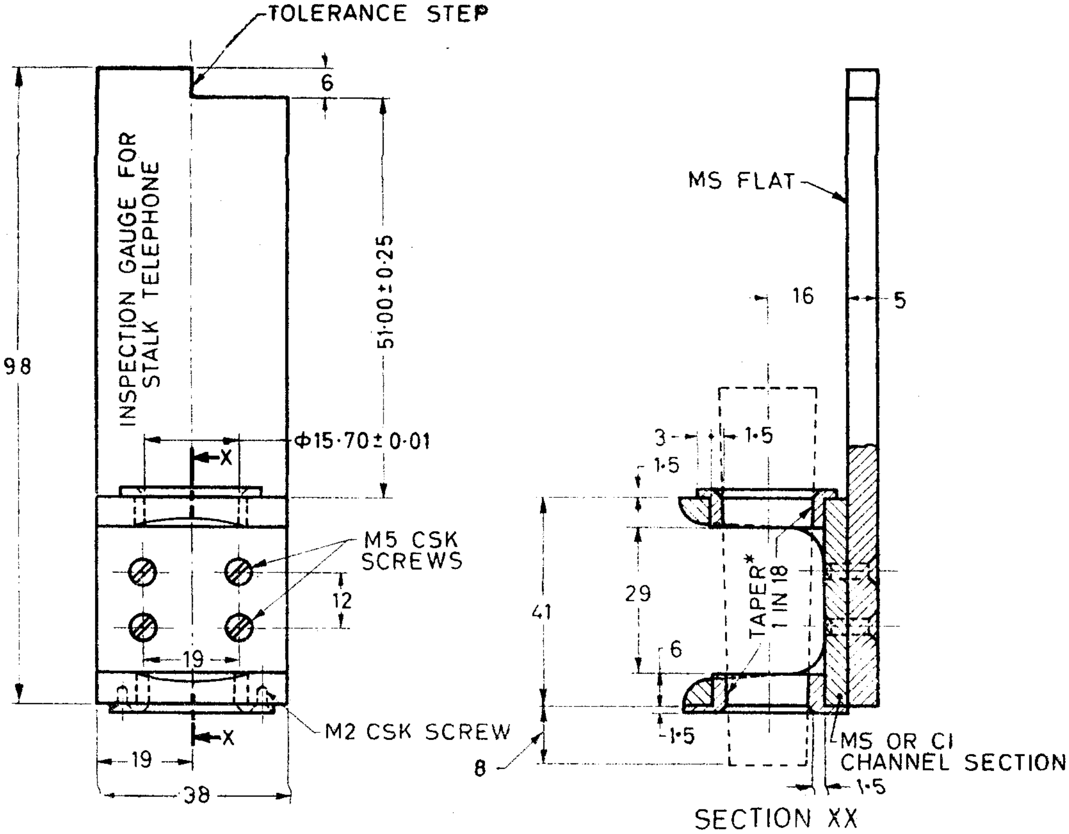
FIG. 7 GAUGES FOR SCREW THREADS (INSULATION END)



NOTES
1 Gauge to be engraved 'Inspection gauge for stalk telephone'.
2 Filed smooth and square.
*Reamed correctly to limits shown.

All dimensions in millimetres.

FIG. 8 INSPECTION GAUGE FOR STALK TELEGRAPH



NOTES
1 Gauge to be engraved 'Inspection gauge for stalk telephone'.
2 Filed smooth and gauge.
*Beamed correctly to limits shown.

All dimensions in millimetres.

FIG. 9 INSPECTION GAUGE FOR STALK TELEPHONE

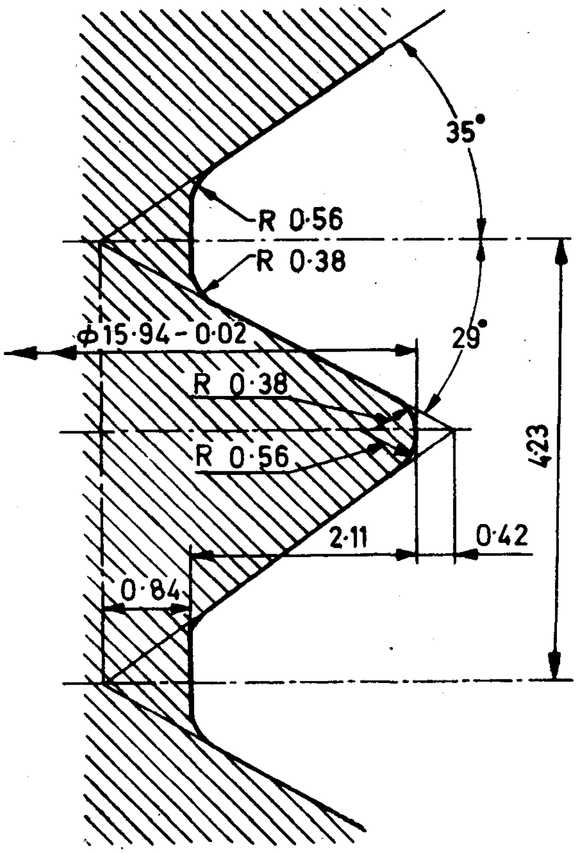
4.3.2 The insulator ends of the stalks shall have screw threads as shown in Fig. 10.

4.4 Washers

Steel washers shall have dimensions in accordance with IS 2016 : 1967 and PVC washers shall have dimensions as shown in Fig. 11.

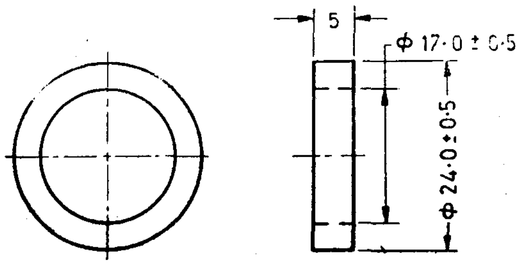
4.5 Hexagonal Head Nuts

The hexagonal head nuts shall have dimensions in accordance with IS 1363 (Part 3) : 1984.



All dimensions in millimetres.

FIG. 10 PROFILE OF SCREW THREADS OF STALK (INSULATOR END)



NOTE — The thickness of washer '5 mm' is subject to a tolerance of ±0·5 mm.

All dimensions in millimetres.

FIG. 11 PVC WASHERS

5 MATERIALS

5.1 Telegraph, Telephone, Swan Neck and 'J'-Stalks and Bracket Attachments

These shall be made of steel conforming to IS 226 : 1975.

5.2 Hexagonal Head Nuts

The nuts shall correspond to designation 4D as specified in IS 1367 (Part 2) : 1979.

5.3 Washers

Steel washers required for bracket attachment terminals and 'J'-stalk shall be made of mild steel. Every stalk for the insulator shall be provided with PVC washers. The properties of PVC shall be as laid down in Annex B.

NOTE—The PVC washers shall be of black colour.

6 MANUFACTURE, WORKMANSHIP AND FINISH

6.1 Stalks shall be well-formed, free from flaws and shall have a good finish.

6.2 Surface Finish

The stalks and nuts shall be hot dip galvanized with zinc conforming to grade 99·95 of IS 209 : 1979. The screw threads of stalks and hexagonal nuts shall be cut before or after galvanizing. In the latter case, the threads shall be oiled or suitably treated to prevent rusting.

7 TESTS

7.1 General

7.1.1 *Type Tests*

The following shall constitute the type tests:

a) Galvanizing test (*see* **7.2**),
b) Cantilever load test (*see* **7.3**),
c) Gauge test (*see* **7.4**), and
d) Visual examination (*see* **7.5**).

7.1.2 *Acceptance Tests*

The following acceptance tests shall be carried out on samples of the lot. The procedure of sampling of the lot is recommended in Annex C.

a) Galvanizing test (*see* **7.2**),
b) Cantilever load test (*see* **7.3**), and
c) Gauge test (*see* **7.4**).

7.1.3 *Routine Test*

The visual examination (*see* **7.5**) shall be the routine test.

7.2 Galvanizing Test

7.2.1 *Surface Inspection*

After galvanizing, stalks shall be stored for at least one week under cover, but as far as possible, with all surfaces exposed to the free movement of air. The zinc coating, as seen by visual inspection, shall be clean, smooth, continuous and free from acid spots.

7.2.2 *Dip Test for Uniformity of Zinc Coating*

The uniformity of zinc coating on the stalks shall meet the requirements of IS 2633 : 1986. The zinc coating shall withstand 4 one-minute dips. This test shall not apply to the threaded portion of the stalk.

7.2.3 *Determination of Weight of Coating*

The weight of zinc coating when determined according to IS 6745 : 1972 shall be not less than 380 g/m^2 of galvanized surface.

7.3 Cantilever Load Test

7.3.1 The finished stalks shall be subjected to the cantilever load as specified in Table 1.

Table 1 Loads for Cantilever Test

Type of Stalk	Test Load, kg
Stalk, telegraph	280
Stalk, telephone	180
Bracket attachment terminal, single	340
Bracket attachment terminal, double	340
Stalks, swan neck	70
'J'-stalk	225

The stalk shall be rigidly fixed simulating line conditions. A double shed large insulator shall be screwed after a PVC; an India-rubber or felt washer, not exceeding 5 mm in thickness, has been placed on the collar. A load in accordance with Table 1 shall then be applied to the wire groove of the insulator at right angles to the axis of the stalk. Figure 12 illustrates the method of load test of telegraph or telephone stalks. For testing of other types of stalks, appropriate fixtures shall be used. The load shall be applied as indicated in Fig. 12.

7.3.2 The permanent set measured corresponding to the end of the insulator threads, after removal of the specified load (*see* Table 1), shall not exceed 3·0 mm.

7.4 Gauge Test

7.4.1 The dimensions of the stalks shall be checked by means of appropriate gauges and in the manner indicated in the figures indicated in Table 2.

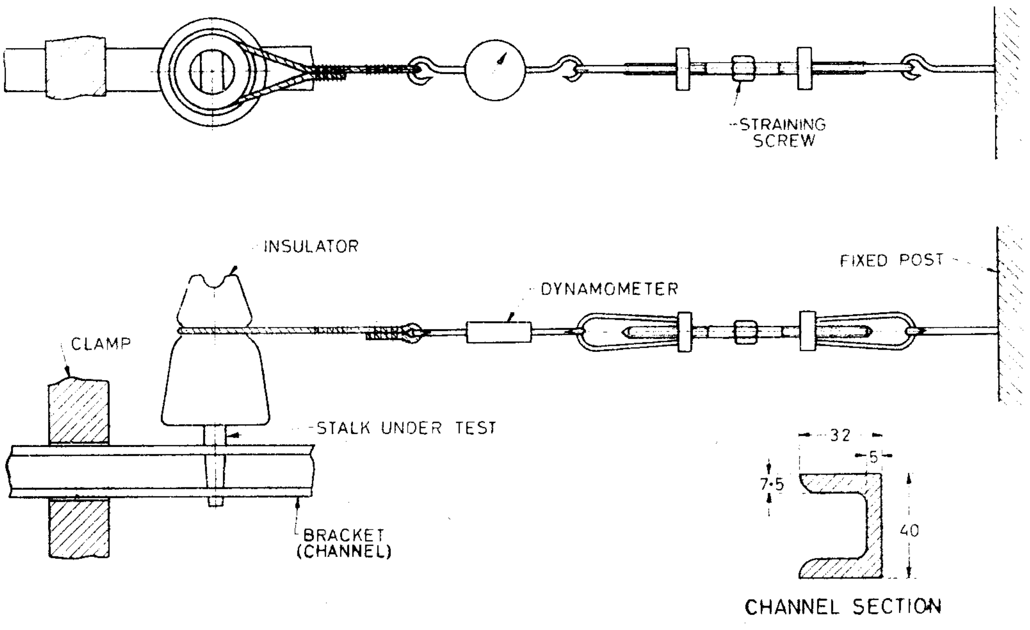
Table 2 Inspection Gauges for Screw Threads and Length

Item	Refer Inspection Gauge
Screw threads (insulator end)	Fig. 7
Stalks, telegraph (length and taper)	Fig. 8
Stalks, telephone (length and taper)	Fig. 9

7.4.2 To pass the inspection gauges shown in Fig. 8 and 9, the top face of the collar of each stalk shall lie within the relevant tolerance step specified.

7.4.3 *Screw Gauge Test*

The screw threads of the insulator end of all types of stalk shall be checked with the following gauge tests (*see* Fig. 7):



All dimensions in millimetres.

FIG. 12 CANTILEVER LOAD TESTING ON INSULATOR STALKS

a) *'GO' GAUGE*

The stalk threads should enter the 'GO' gauge as far as the stalk collar,

b) *'NOT GO' GAUGE*

The stalk threads shall not enter by more than one and a half threads, and

c) *'NOT GO' RING GAUGE*

The stalk threads shall not enter with the 'NOT GO' RING GAUGE.

NOTE—By the prior agreement between the user and the manufacturer, the tests listed in **7.4.3**(b) and **7.4.3**(c) may not be carried out.

7.4.4 Unless otherwise stated, the gauges shall be of hardened tool steel. They shall be finished bright with surfaces protected from oxidation by treatment with neutral petroleum jelly.

7.5 Visual Examination

All stalks shall be examined visually for workmanship and finish.

8 PACKING

8.1 Stalks shall be securely packed in double gunny packing or wooden cases. Unless otherwise agreed to between the purchaser and the supplier, the number of stalks in each package or case shall be as given in Table 3.

8.2 Each type of stalk shall be kept separate when packed and no package shall contain more than one variety.

Table 3 Packing Schedule for Stalks

(*Clause* 8.1)

Type of Stalk	Quantity in One Package
Stalks, telegraph	100
Stalks, telephone	200
Bracket attachment terminal, single	20
Bracket attachment terminal, double	15
Stalks, swan neck, long and short	50
'J'-Stalks	50

9 MARKING

9.1 Each package shall be stencilled or labelled with:

a) Manufacturer's name and trade-mark (if any),

b) Description of contents, and

c) Quantity.

9.1.1 If required by the purchaser, the name of consignee of stalks may be marked on each package.

ANNEX A

(*Clause* 2.1)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
209 : 1979	Specification for zinc (*third revision*)
226 : 1975	Specification for structural steel (standard quality) (*fifth revision*)
1363 (Part 3) : 1984	Specification for hexagon head bolts, screws and nuts of product grade C : Part 3 Hexagon nuts (size range M 5 to M 36) (*second revision*)
1367 (Part 2) : 1979	Technical supply conditions for threaded steel fasteners : Part 2 Product grades and tolerances (*second revision*)
2016 : 1967	Specification for plain washers (*first revision*)
2500 (Part 1) : 1973	Sampling inspection tables: Part 1 Inspection by attributes and by count of defects (*first revision*)
2633 : 1986	Methods of testing uniformity of coating on zinc coated articles (*second revision*)
4218 (Part 3) : 1976	ISO metric screw threads : Part 3 Basic dimensions for design profiles (*first revision*)
5831 : 1984	Specification for PVC insulation and sheath of electric cables (*first revision*)
6745 : 1972	Methods for determination of weight of zinc coating on zinc coated iron and steel articles

ANNEX B

(*Clause* 5.3)

REQUIREMENTS FOR CLASS C FLEXIBLE PVC COMPOUNDS

B-1 REQUIREMENTS OF PVC COMPOUNDS

B-1.1 The PVC used for the manufacture of PVC washer shall have properties given in Table 4. The sample for the test shall be prepared from the PVC raw material in accordance with IS 5831 : 1984. There are three types of raw material (Type 1, Type 2 and Type 3). Any of the above type is acceptable. The manufacturer shall indicate the type supplied. The manufacturer shall arrange to submit the required sample of the PVC raw material as and when called for by the testing authority.

Table 4 Requirements of PVC Compounds

Sl No. (1)	Characteristic (2)	Type 1 (3)	Type 2 (4)	Type 3 (5)
i)	Tensile strength, kg/cm^2, *Min*	110	90	140
ii)	Elongation at break, percent, *Min*	180	150	180
iii)	Durometer hardness, Shore A	60-84	55-80	Greater than 85
iv)	Loss of mass on heating, percent, *Max*	3·0	4·0	3·0
v)	Water absorption, mg, *Max*	200	200	150
vi)	Water soluble matter, mg, *Max*	20	20	20

ANNEX C

(*Clause* 7.1.2)

SAMPLING PROCEDURE FOR ACCEPTANCE TESTS

C-1 SAMPLING PROCEDURE

C-1.1 Lot

In a consignment, all the stalks of same type and design manufactured under similar conditions of production shall be grouped together to constitute a lot.

C-1.2 Unless otherwise agreed to between the supplier and the purchaser, the procedure given in IS 2500 (Part 1) : 1973 shall be followed for sampling inspection. For various characteristics, the sampling plan as given in **C-1.3** to **C-1.5** shall be followed.

C-1.3 For gauge test, single sampling plan with inspection level V and acceptable quality level (AQL) 1 percent as given in Tables 1 and 2 of IS 2500 (Part 1) : 1973 shall be followed.

C-1.4 For cantilever test, single sampling plan with inspection level IV and AQL of 1·5 percent as given in Tables 1 and 2 of IS 2500 (Part 1) : 1973 shall be followed.

C-1.5 For galvanizing test, single sampling plan with inspection level II and AQL of 1·5 percent as given in Tables 1 and 2 of IS 2500 (Part 1) : 1973 shall be followed.

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